ASSESSMENT OF EFFECTIVENESS OF AUDIO-VISUAL TEACHING AND LEARNING AIDS ON DEVELOPING STUDENT'S CRITICAL THINKING: A CASE OF SECONDARY SCHOOLS IN KARAGWE DISTRICT

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CERTIFICATION

The undersigned certifies that they have read and hereby recommends for acceptance by the Open University of Tanzania a dissertation entitled, **"An Assessment of the Effectiveness of Audio-Visual Teaching and Learning Aids on Developing Student's Critical Thinking: A Case of Secondary Schools in Karagwe District"** In partial fulfillment of the requirements for the award of Degree of Master of Education in Curriculum Design and Development (MED.CDD) of the Open University of Tanzania.

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I **Simon Ibrahim,** declare that, the work presented in this Dissertation is original. It has never been presented to any other University or Institution. Where other people's works have been used, references have been provided. It is in this regard that I declare this work as originally mine. It is hereby presented in partial fulfillment of the requirement for the Degree of Master of Education in Curriculum Design and Development (MED-CDD) of the Open University of Tanzania

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Signature

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Date

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ABSTRACT

This study examined the effectiveness of audio-visual (AV) teaching and learning aids in developing students' critical thinking in secondary schools in Karagwe District. The objectives were to determine the extent to which AV teaching aids are utilized, assess the level of students' critical thinking, and examine the extent to which AV aids enhance critical thinking development. The study adopted a quantitative research approach underpinned by a positivist philosophy and employed a survey research design. A convenient sampling technique was used to select 346 respondents from secondary schools. Data were collected using structured questionnaires and analyzed through descriptive and inferential statistics. The findings revealed that the utilization of AV teaching aids in secondary schools was moderate, but their use had a positive and significant influence on students' critical thinking. Students taught using AV-supported lessons demonstrated improved problem-solving skills, stronger analytical reasoning, and a better ability to apply knowledge in real-life contexts compared to those taught using traditional methods. Furthermore, AV aids enhanced student engagement, participation, and collaboration during lessons. The study concludes that AV teaching aids play a critical role in improving students' critical thinking and recommends increasing access to AV resources through coordinated efforts by the government, school administrations, and stakeholders. Additionally, regular teacher training and capacity-building programs are essential to equip educators with the necessary technical and pedagogical skills for effective integration of AV aids into classroom practices.

Keywords: Audio-visual aids, critical thinking, secondary education, constructivist pedagogy, Tanzania

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LIST OF ABBREVIATIONS

ACT   American College Testing

ADSI   African Digital Schools Initiative

AV   Audio-Visual

CSEE   Certificate of Secondary Education Examination

CSEE   Certificate of Secondary Education Examination

DRC   Democratic Republic of Congo

KDC   Karagwe District Council

KICD   Kenya Institute of Curriculum Development

NAEP   National Assessment of Educational Progress

NECTA   National Examination Council of Tanzania

STAAR   State of Texas Assessments of Academic Readiness

TIE   Tanzania Institute of Education

UNESCO   United Nations Educational, Scientific and Cultural Organization

UNICEF   United Nations Children's Fund

URT   United Republic of Tanzania

CHAPTER ONE

INTRODUCTION AND BACKGROUND TO THE PROBLEM

1.1 Introduction

Critical thinking is an essential ability for success in the workplace, in school, and in personal life that allows students to successfully assess, analyze, and apply data to solve issues and make wise decisions. In secondary education, fostering critical thinking is increasingly important to prepare students for a dynamic, interconnected world. However, educational reforms in Tanzania, many secondary school students, including those in Karagwe District, continue to struggle with higher-order thinking skills, as shown by poor performance in NECTA examinations especially to questions related to critical thinking skills. This challenge highlights the need for innovative teaching methods. Audio-visual (AV) teaching and learning aids, known for enhancing engagement and deeper understanding, have shown promise globally in promoting critical thinking. Therefore this chapter presented the background of the study, statement of the problem, research objective, research questions and significance of the study.

1.2 Background to the problem

In the 21st century, critical thinking is an essential skill for coping with a complex and fast-changing world. It enables individuals to analyze, evaluate, and interpret information effectively, make informed decisions, solve problems creatively, and adapt to new situations. In today's knowledge-driven society, where misinformation is widespread and global challenges demand innovative solutions, critical thinking fosters intellectual independence and responsible citizenship. It encourages

questioning assumptions, considering diverse perspectives, and applying logic and reasoning. As a result, education systems globally emphasize developing critical thinking to prepare learners for success in an interconnected world (Ashaver & Igyuve, 2013).

In Europe, integrating critical thinking into education is a priority, though progress varies. In Finland, 78% of 15-year-olds demonstrate confidence in problem-solving, compared to 72% in Sweden and 75% in the Netherlands, while about 15–20% struggle due to resource disparities or inadequate teacher training. In Eastern Europe, around 50% of students in Bulgaria and Romania display adequate skills, but 30% face challenges due to outdated curricula and limited resources (Harcourt, 2020).

In Africa, critical thinking development is uneven due to limited resources, large class sizes, and insufficient teacher training (Adebayo, 2023; Nkrumah & Tetteh, 2022). For instance, South Africa has integrated inquiry-based learning into its curriculum, with 55% of students engaged in problem-solving, though 30% still struggle due to resource gaps (Department of Basic Education, 2024; Smith & Mabuza, 2023). Similarly, in Kenya, 60% of students participate in critical-thinking activities, but 25% face challenges linked to inconsistent curriculum implementation and limited teacher preparation (KICD, 2023; Omolo & Ndirangu, 2022).

In Tanzania, critical thinking remains a significant challenge despite curriculum reforms. Reports from the National Examination Council of Tanzania (NECTA) show persistent weaknesses in higher-order cognitive skills. For example, in the 2021 CSEE, 97.4% of students failed to analyze poems in an English exam question (NECTA, 2021). In 2022, 75.42% struggled with a biology question requiring

evaluation of family planning methods, while in 2023, 64.43% underperformed on a poetry analysis task (NECTA, 2022; 2023). Notably, only 9.5% of students produced insightful, well-structured responses, while most gave descriptive answers lacking depth.

In Karagwe District, results reflect a similar trend. At Kihanga Secondary School, low performance reached 62.4% in 2022, 66.67% in 2023, and 58.68% in 2024. At Kiruruma Secondary School, failure rates rose from 76.0% in 2022 to 85.48% in 2023 before improving slightly to 77.11% in 2024. Igurwa Secondary School recorded 87.18% in 2022, 80% in 2023, and 75% in 2024. By contrast, Ndama Secondary School improved from 56.52% in 2022 to 35.25% in 2024 (NECTA, 2022–2024).

According to Kanyamwenge (2024), large class sizes of 60–80 students hinder effective learning and limit individual feedback, reducing opportunities for active engagement and critical thinking. These realities contrast with Tanzania's Education and Training Policy (1995) and Education Policy (2014), which recommend manageable class sizes for effective teaching.

To address these challenges, the Tanzania Institute of Education (TIE) revised the curriculum to integrate inquiry-based learning, problem-solving, and student-centered approaches (TIE, 2022). Teacher training initiatives supported by UNESCO and local organizations aim to equip teachers with techniques for fostering critical thinking, including effective questioning, designing analytical exercises, and using formative assessments (URT, 2022).

Additionally, audio-visual (AV) teaching aids are increasingly used to enhance understanding and engagement. Tools such as videos, interactive whiteboards, and digital simulations enrich learning and promote higher-order thinking (ADSI, 2019). However, critical thinking levels remain below expectations due to persistent resource gaps, limited teacher capacity, and curriculum implementation challenges. Addressing these barriers through reforms, adequate resources, and innovative teaching methods is vital for improving students' cognitive skills and achieving Tanzania's educational goals (Komba & Shukia, 2023).

1.3 Statement of the Problem

Critical thinking is a key 21st-century skill that enables learners to analyze, evaluate, and solve problems effectively. It supports creativity, innovation, and lifelong learning. However, in Tanzania, secondary school students show low levels of critical thinking, affecting academic performance and overall educational outcomes (Care, Vista & Kim, 2018).

NECTA statistics highlight the magnitude of the problem. In the 2021 CSEE, 97.4% of students failed an English question requiring literary analysis, while in the 2022 CSEE, 75.42% failed to evaluate family planning methods in Biology. These results reveal serious weaknesses in analytical and reflective skills (NECTA, 2021; 2022). If not addressed, poor academic performance and limited problem-solving abilities will persist, negatively affecting students' careers and national development.

To address the challenge, the Tanzania Institute of Education (TIE) revised the curriculum to integrate critical thinking and promoted student-centered teaching

methods. Teacher training programs were also introduced (TIE, 2022; URT, 2022). However, despite these efforts, students' critical thinking skills remain below expectations, indicating the need for alternative teaching strategies.

Studies elsewhere, such as Ibe and Abamuche (2019), show that audio-visual (AV) aids improve engagement, reasoning, and problem-solving. Yet, little empirical research in Tanzania has explored their effectiveness in developing critical thinking. This study, therefore, seeks to fill this gap by examining the effectiveness of audio-visual teaching and learning aids in enhancing students' critical thinking in secondary schools in Karagwe District.

1.4 Objectives of the Study

1.4.1 General Objective

To examine the effectiveness of audio-visual teaching and learning aids on developing student's critical thinking in secondary schools in Karagwe District.

1.4.2 1Specific Objective

1. To explore the extent to which Audio-Visual teaching aids are utilized in secondary schools in Karagwe District.

2. To examine level of critical thinking among secondary school students in Karagwe District.

3. To examine the extent to which audio-visual teaching aids are utilized to enhance the development of critical thinking among secondary school students in Karagwe District

1.5 Research Questions

1. To what extent the Audio-Visual teaching aids are used in developing pupil's critical thinking in secondary schools in Karagwe District

2. What is the level of thinking skills among secondary school students in Karagwe District?

3. To what extent do the uses of audio-visual aids enhance the development of critical thinking among sec. school students in karagwe District?

1.6 Significance of the Study

The study findings will provide understanding to stake holders in education sector in Tanzanian, including Ministry of Education, Science and Technology, President's Office Regional Administration and Local Governments, Karagwe District Councils, Teachers and Parents on the type of AV teaching aids used on the developing pupil's critical thinking in secondary schools, the extent to which the Audio-Visual teaching aids used in developing pupil's critical thinking in secondary schools, and the influence of Audio-Visual teaching aids on the developing pupil's critical thinking in secondary schools. The study findings will influence teachers 'choice on the use of effective developing pupil's critical thinking. The study findings also inform curriculum developers to fine-tune secondary school curriculum to address the needs of 21stcentury skills. The theory of instruction may benefit from this study's contributions.

1.7 Scope of the Study

The study was confined to public secondary schools in Karagwe District, Tanzania, focusing on the use of audio-visual teaching aids to develop students' critical

thinking skills. A total of 346 students from Kihanga, Kiruruma, Nyakatoro, Igurwa, and Ndama Secondary Schools participated. Guided by the research objectives, the study examined the extent of audio-visual aid utilization, challenges in their use, and their effectiveness in enhancing students' critical thinking, using a survey method for data collection.

1.8 Limitations of the study

The study faced several limitations. First, data were collected only from five public secondary schools in Karagwe District, which may limit the generalizability of the findings to other schools or districts. Second, the study relied primarily on student responses through surveys, which may be influenced by personal perceptions and biases. Time constraints and limited resources also restricted the scope of the study, affecting the depth of data collection and analysis.

1.9 Delimitations of the study

This study was deliberately confined to public secondary schools in Karagwe District, focusing specifically on the use of audio-visual teaching aids to develop students' critical thinking skills. Private schools and other districts were excluded to maintain focus and feasibility. The study targeted only students, without including teachers or administrators, as the research objectives centered on students' experiences and performance related to audio-visual learning tools.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

The chapter presented the literature relating to audio-visual teaching and learning aids and student's critical thinking. The literature presented including definitions of Audio Visual Teaching and Learning Aids, and Student's Critical Thinking. The chapter also presented types of Audio Visual teaching and Learning Aids, and Types of Students' Critical Thinking. Furthermore, the chapter presented Theoretical Framework, Empirical Studies, Research Gap and Conceptual Framework.

2.2 Theoretical literature review

This study was guided by the constructivist learning theory, which emphasizes that learners actively construct knowledge through experiences and reflection (Piaget, 1954; Vygotsky, 1978). Learning is viewed as an active process in which students develop understanding by interacting with their environment and processing the information presented to them. In relation to the study's first objective, which explored the extent to which audio-visual teaching aids are utilized, the theory supports the use of AV aids as interactive tools that engage students and encourage exploration and participation in classroom activities. Regarding the second objective, which examined the level of critical thinking among students, constructivist principles highlight that learners develop higher-order thinking skills through active engagement and reflection, suggesting that AV-assisted lessons can foster analytical reasoning and problem-solving

abilities. For the third objective, which assessed the extent to which AV teaching aids enhance critical thinking, the theory underscores that meaningful, learner-centered experiences enable students to construct knowledge, apply concepts in practical contexts, and refine their understanding, thereby strengthening critical thinking competencies. Overall, the constructivist framework provides a strong theoretical basis for understanding how the strategic use of audio-visual teaching aids can promote interactive learning and the development of critical thinking skills in secondary school students.

2.3 Definition of Key Terms

2.3.1 Audio Visual Teaching and Learning Aids

Audio-Visual Teaching and Learning Aids are educational tools that blend auditory and visual elements to create a more dynamic and effective learning environment (McGarr, 2009).

2.3.2 Students' Critical Thinking

Students' Critical Thinking refers to the cognitive ability to actively and skillfully engage with information through conceptualization, analysis, evaluation, and synthesis. This process involves more than just absorbing information; it requires students to critically question and reflect upon the material they encounter. By actively engaging in these processes, students develop the capacity to dissect complex concepts, assess the validity of arguments, and integrate diverse pieces of information (Mathew and Alidmat, 2013).

2.4 Type of Audio Visual Teaching and Learning Aids

2.4.1 Multimedia Presentations

Multimedia presentations integrate various forms of media text, images, audio, and video into a cohesive format that enhances the delivery of information. Tools like PowerPoint and Prize are widely utilized to craft these presentations, allowing educators to create dynamic and engaging content. By incorporating visual elements such as diagrams, charts, and photographs alongside textual explanations, multimedia presentations can effectively illustrate complex concepts. This multimodal approach helps in making abstract or difficult ideas more tangible and accessible, facilitating a deeper understanding for students who might struggle with traditional text-based instruction alone (McGarr, 2009).

2.4.2 Audio Recordings and Podcasts

Audio recordings and podcasts offer valuable resources for auditory learners by delivering content through listening. These aids can include a variety of formats such as lectures, interviews, and discussions, which provide students with opportunities to engage with material in an auditory manner. For auditory learners, who process information best through hearing, these audio aids can significantly enhance understanding and retention. By listening to expert opinions, detailed explanations, or diverse viewpoints, students can reinforce their grasp of concepts and gain alternative perspectives that might not be fully captured in traditional text-based materials (Komba and Shukia, 2023)

2.4.3 Virtual Reality (VR)

Virtual Reality (VR) creates immersive, interactive environments that simulate either real or imagined worlds, providing students with a unique and engaging learning experience. Through VR, students can explore detailed virtual settings that replicate real-life scenarios or fantastical environments, allowing for a hands-on approach to learning that traditional methods may not offer (Hew and Cheung, 2014).

2.4.4 Augmented Reality (AR)

Augmented Reality (AR) overlays digital information onto the real world using devices such as smartphones or AR glasses, creating an interactive learning experience that enhances students' understanding of complex concepts. Unlike VR, which immerses students in a completely virtual environment, AR blends digital content with the physical world, allowing students to interact with and manipulate digital elements within their real-world context (Karehka, 2013).

2.4.5 Educational Games and Simulations

Educational games and simulations engage students through interactive, game-based mechanics or simulated environments, providing a dynamic way to learn and apply knowledge. These tools often incorporate elements of problem-solving, decision-making, and strategic thinking, allowing students to tackle challenges and make decisions within a controlled yet realistic context. By participating in these interactive experiences, students can practice and refine their critical thinking skills, explore theoretical concepts in a hands-on manner, and receive immediate feedback on their performance. For example, a simulation of an ecological system can help students understand environmental interactions and consequences, while a game-

based scenario involving economic decisions can teach principles of finance and resource management (Komba and Shukia, 2023).

2.5 Types of Students' Critical Thinking

2.5.1 Analytical Thinking

Analytical thinking involves breaking down complex information into smaller parts for examination. AV aids such as documentary clips or interactive timelines help students dissect historical events, scientific processes, or literary texts. For instance, an animated video showing the step-by-step process of photosynthesis enables learners to analyze individual stages and understand how they relate to each other. These tools enhance students' ability to recognize patterns, identify biases, and compare sources, all of which are crucial for analytical thought (Norris & Ennis, 1989).

2.5.2 Evaluative Thinking

Evaluative thinking is enhanced through exposure to multiple viewpoints and real-world case studies. Watching a panel discussion or comparing different documentary portrayals of the same issue encourages students to assess the credibility of sources, the logic of arguments, and the strength of supporting evidence. This comparison sharpens students' judgment skills and trains them to make informed evaluations about the quality and reliability of information (Hattie & Timperley, 2007).

2.5.3 Creative Thinking

Creative thinking flourishes when students are given tools to imagine, create, and innovate. Using digital platforms to create their own videos, podcasts, or

infographics allows learners to express ideas in original ways. For example, students might use animation software to illustrate a new invention or design a multimedia presentation proposing solutions to environmental issues. These AV tools promote divergent thinking by encouraging students to explore multiple pathways and express novel ideas (Guilford, 1956).

2.5.4 Reflective Thinking

Reflective thinking is supported by tools that enable students to document and revisit their learning processes. AV aids like video journals or digital portfolios allow students to record their thoughts, monitor their growth, and critique their own work. Watching and analyzing their own recorded presentations, for example, helps them identify strengths and areas for improvement, deepening their metacognitive awareness and self-regulation (Schön, 1983).

2.5.5 Critical Reasoning

Critical reasoning is nurtured through structured, logic-based learning tools. Digital platforms that present logical puzzles simulate legal or ethical debates, or map arguments visually enable students to practice constructing sound reasoning and identifying logical fallacies. For instance, an app that guides students through building an argumentative essay step-by-step supports their understanding of how claims, evidence, and reasoning work together to form a valid argument (Walton, 2008).

2.5.6 Problem-Solving

Problem-solving is most effective when students are placed in dynamic, real-world contexts. AV aids such as virtual science labs or business simulations immerse

students in complex situations where they must analyze problems, weigh options, and test solutions. For example, a virtual simulation of managing a community's water resources requires students to balance economic, social, and environmental factors mirroring real-life decision-making and applying interdisciplinary knowledge (Polya, 1957).

2.6 Empirical Studies

2.6.1 Levels of Critical Thinking among secondary School Students

The study by Arisoy and Aybek(2021) on the effects of subject-based critical thinking education in mathematics on students' critical thinking skills and virtues in Turkey. The study utilized a quasi-experimental design featuring pre-test and post-test control groups to evaluate the impact of subject-based critical thinking education in mathematics on students' critical thinking skills and virtues. The study found notable improvements in students' performance on the MCTT and increased scores on the CTVPS following the intervention. This suggests that incorporating critical thinking education into the mathematics curriculum can effectively enhance students' cognitive skills and foster essential critical thinking virtues. The study underscores the value of integrating critical thinking education into academic subjects to promote deeper cognitive development among students.

Lapuzand Fulgencio(2020) conducted a study on improving the critical thinking skills of secondary school students using problem-based learning. The study used an experimental design. Twenty-seven (27) students were purposively selected from a secondary school in Zambales, Philippines for the school year 2017-2018. The study findings revealed that there was a significant difference in the test scores before and

after the intervention. The study found that problem-based learning (PBL) was effective in enhancing students' critical thinking skills, as evidenced by the statistical analysis conducted. The study also found that PBL is effective teaching strategy for developing and improving critical thinking skills among secondary school students. The study recommends that problem-based learning may improve the level of critical thinking skills of the students and improve the teaching learning process.

2.6.2 The Extent of the Utilization of Audio-Visual Aids in Teaching in Secondary Schools

Mugisha et al. (2021) conducted a study on teaching critical thinking about health using digital technology in lower secondary schools in Rwanda. The study employed a qualitative descriptive approach incorporating four methods: document review, key informant interviews, focus group discussions, and observations. It involved reviewing 29 documents related to the national curriculum and ICT conditions in secondary schools. The study found the limited use of ICT in teaching, even when audio-visual aids like projectors and computers were available. Several factors contributed to this underutilization, including insufficient access to devices, lack of teacher training, and a lack of understanding about how ICT can be used to enhance critical thinking. Many teachers lacked the necessary skills and confidence to effectively incorporate digital tools into their lessons, and there was an inconsistency in how ICT was understood and applied to stimulate critical thinking in students.

Peter (2023) conducted a comprehensive study titled "The Use of E-Pedagogy: Towards a Model for Technology-Based Education for Secondary Schools in Tanzania". This research adopted a qualitative exploratory methodology, utilizing a

multiple-case study design to investigate the integration of technology in secondary education. Data were gathered from ten educational institutions across Tanzania, employing a combination of structured and semi-structured interviews, observation checklists, and document reviews, which included relevant policies and academic literature.

For data analysis, the study incorporated both descriptive statistics and qualitative content analysis to interpret the findings. The results revealed that technology-enhanced pedagogical strategies such as the use of collaborative digital tools, ramification techniques, and artificial intelligence applications, played a significant role in promoting critical thinking among students. These approaches fostered active learning, stimulated creativity, and encouraged problem-solving skills.

Despite these positive outcomes, the study also identified several systemic challenges that hinder the effective implementation of technology in the classroom. Key barriers included inadequate infrastructure, limited access to digital tools, and a lack of proper training and support for educators. These issues collectively impeded the full potential of technology to enhance critical thinking and overall learning experiences in Tanzanian secondary schools.

2.6.3 The Extent of Audio-Visual Teaching Aids Utilized to Enhance the Development of Critical Thinking among Secondary School Students

Mugisha et al. (2021) also conducted a study on teaching critical thinking about health using digital technology in lower secondary schools in Rwanda. The study employed a qualitative descriptive approach incorporating four methods: document review, key informant interviews, focus group discussions, and observations. The

findings revealed two main themes. First, there is a recognized need for teaching critical thinking about health. While the current curriculum explicitly aims to develop students' critical thinking skills and integrates health topics across subjects, the understanding and implementation of critical thinking vary among teachers, and critical thinking about health is not consistently taught. Second, regarding ICT conditions, most public schools are equipped with computers, projectors, and internet connectivity. However, the use of ICT in teaching is limited, largely due to inadequate computer-to-student ratios.

The study conducted by Mkimbili (2022), the extent to which Biology syllabi for Ordinary-level and Advanced-level secondary education in Tanzania promote the development of critical thinking skills. It focuses on evaluating whether these syllabi align with critical thinking elements as identified in existing educational literature. The study's objective was to explore how well the syllabi support critical thinking by reviewing their specific objectives and assessing whether these align with the assessment questions provided. To achieve this, the study utilized the Atlas TI program for data analysis, allowing for a comprehensive examination of the content and objectives. The findings of the study reveal a significant emphasis on lower-order thinking (LOT) skills, consistent with Bloom's taxonomy of learning. Specifically, the syllabi under review tend to focus more on foundational knowledge and comprehension rather than on higher-order thinking skills, such as analysis, evaluation, and creation. The syllabi do not fully support the development of critical thinking skills necessary for advanced cognitive tasks.

Lapuzand Fulgencio(2020) conducted a study on improving the critical thinking skills of secondary school students using problem-based learning. The study used an experimental design. Twenty-seven (27) students were purposively selected from a secondary school in Zambales, Philippines for the school year 2017-2018. The study findings revealed that there was a significant difference in the test scores before and after the intervention. The study found that problem-based learning (PBL) was effective in enhancing students' critical thinking skills, as evidenced by the statistical analysis conducted. Specifically, the study employed mean analysis, standard deviation, and t-tests to evaluate the data collected from the students before and after the PBL intervention. The results of these analyses revealed a significant improvement in students' test scores, indicating that PBL had a positive impact on their ability to engage in critical thinking. The mean scores increased, showing an improvement in students' performance, while the standard deviations suggested reduced variability in their responses, and the t-test confirmed the statistical significance of the observed improvements. The study found that PBL is effective teaching strategy for developing and improving critical thinking skills among secondary school students. The study recommends that problem-based learning may improve the level of critical thinking skills of the students and improve the teaching learning process.

The study conducted by Alfaki and Alharthy (2024) examined the role and effectiveness of instructional materials in the teaching and learning of the English language within the context of secondary schools in Tanzania. Adopting a qualitative research approach, the researchers utilized classroom observations and in-depth

interviews with English as Foreign Language (EFL) teachers, drawing particular insights from Saudi EFL classrooms as comparative or referential cases. The focus of the study was on how educators incorporate various forms of visual aids, such as videos, images, info graphics, and multimedia presentations into their teaching strategies to enhance student learning outcomes.

The findings revealed a strong correlation between the use of visual aids and the enhancement of students' critical thinking abilities. Visual stimuli not only made classroom content more accessible and relatable but also fostered a more interactive and cognitively stimulating environment. Students demonstrated higher levels of engagement during lessons that employed visual materials, often participating more actively through questioning, discussion, and critical analysis. The presence of visual aids encouraged learners to interpret content more deeply, make connections with prior knowledge, and evaluate the information presented, thereby developing essential analytical skills. According to the study, these instructional tools were particularly effective in promoting higher-order thinking, suggesting that visual aids are not merely supplementary resources but integral to fostering meaningful and reflective learning in EFL classrooms.

2.7 Research Gap

Although prior studies have examined various approaches to critical thinking education such as digital technology integration, problem-based learning, curriculum alignment, and subject-specific strategies there is limited research on the specific role of audio-visual teaching and learning aids. Unlike digital technology or other pedagogical methods, audio-visual aids provide interactive and immersive learning

experiences that can uniquely engage students, stimulate reflection, and promote analytical reasoning. This gap is particularly relevant to the study's objectives, which focus on exploring the extent of AV aid utilization, examining students' critical thinking levels, and assessing the effectiveness of AV aids in enhancing critical thinking. By addressing this gap, the present study applies constructivist learning theory to investigate how audio-visual tools facilitate active knowledge construction and foster critical thinking competencies among secondary school students in Karagwe District.

2.8 Conceptual Framework

The conceptual framework of this study illustrates the relationship between the use of audio-visual (AV) teaching aids and the development of students' critical thinking skills in secondary schools, grounded in constructivist learning theory. AV teaching aids, including projectors, charts, videos, and other audio-visual tools, serve as the independent variable and are expected to create interactive and immersive learning environments. Through these tools, students engage actively in classroom activities, participate in discussions, reflect on content, and apply knowledge to problem-solving tasks, which represent the mediating processes. These processes, in turn, contribute to the enhancement of students' critical thinking skills, measured by analytical reasoning, problem-solving ability, evaluation of information, and practical application of knowledge. The framework also acknowledges contextual and moderating factors, such as teacher training, resource availability, and school support, which can influence the extent to which AV teaching aids effectively foster critical thinking. Overall, this framework emphasizes that the structured and

consistent use of AV aids promotes active knowledge construction, aligning with the study's objectives of exploring AV aid utilization, examining students' critical thinking levels, and assessing the effectiveness of AV aids in developing these skills.

INDEPENDENT VARIABLES	DEPENDENT VARIABLES
Audio-Visual Teaching Aids	Students' Critical Thinking Skills
Multimedia presentations	
Virtual Reality	• Analytical Reasoning
Educational games	• Evaluation,
	• Application

INTERVENING VARIABLE

Student Engagement & Learning Processes

- Active Participation,
- Problem-Solving
- Reflection
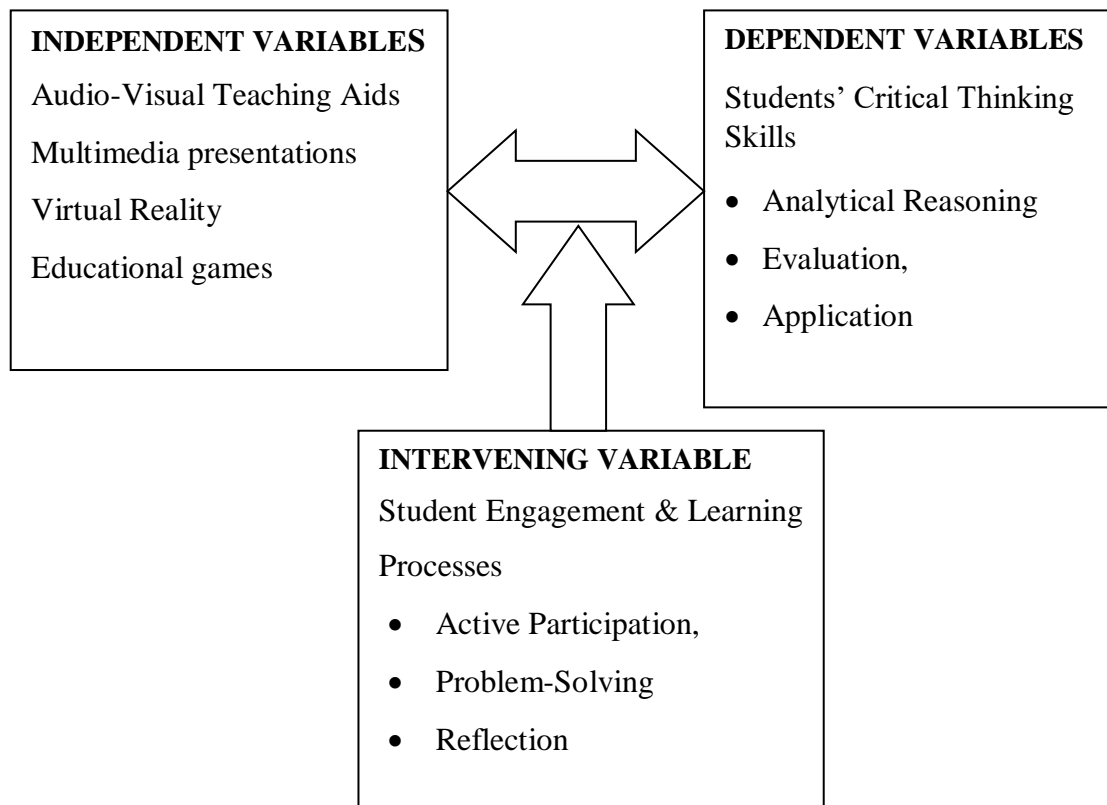
Figure 2.1: Conceptual Framework

Source: Researcher owner (2025)

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the methodology of the study in which the research design, area of study, targeted population, sample and sampling techniques, data collection methods, validity and reliability of research instruments, data analysis techniques and research ethics were explained.

3.2 Research Approach

The study employed quantitative research approach to examine the effectiveness of audio-visual teaching and learning aids on developing student's critical thinking in secondary schools in Karagwe District. By employing a quantitative research approach, the study employed survey method and questionnaire instruments to gather data from a significant number of respondents. This methodology also enabled the researcher to employ quantitative data analysis techniques, such as descriptive statistics to analyze the numerical data.

3.3 Research Philosophy

The study adopted a positivism philosophy to examine the effectiveness of audio-visual teaching and learning aids on developing student's critical thinking in secondary schools in Karagwe District. The positivism philosophy emphasizes the importance of observable and measurable phenomena, utilizing statistical and numerical analysis to derive conclusions. This approach is rooted in the belief that reality is objective and can be comprehensively understood through empirical

evidence. By employing a positivism philosophy, the study seeks to contribute valuable insights into how audio-visual teaching and learning aids on developing student's critical thinking in secondary schools.

3.4 Research Design

The study employed survey research design to examine the effectiveness of audio-visual teaching and learning aids on developing student's critical thinking in secondary schools in Karagwe District. The study employed survey research design because it allows the collection of large amounts of data from a diverse group of students, providing a comprehensive picture of the students' perception toward the effectiveness of audio-visual teaching and learning aids on developing student's critical thinking in secondary schools. Surveys research design also provided quantitative data was easily analyzed using statistical techniques, allowing for a more objective assessment. Furthermore, the use questionnaires are a cost-effective research instruments, as they can reach a large number of students. Lastly, survey research design offers participants anonymity, which can lead to more responses that are honest and reduce the likelihood of bias in the data collected.

3.5 Study Area

The study was conducted in secondary schools in Karagwe District, chosen due to the district's historically poor performance in secondary education. This underperformance is largely attributed to a lack of critical thinking skills among students. For instance, in the 2023 Certificate of Secondary Education Examination (CSEE), a significant proportion of students from several schools in

the district scored poorly. At Kihanga Secondary School, 67% of students scored division four and zero. Similarly, at Kiruruma Secondary School, 85% of students scored division four and zero; at Igurwa Secondary School, 80% of students scored division four and zero; and at Ndama Secondary School, 69% of students scored division four and zero (NECTA, 2023).

3.6 Targeted Population

The targeted population for this study from Kihanga, Kiruruma, Nyakatoro, Igurwa, and Ndama Secondary Schools. Together, these schools have a total of 2,517 students (KDC,2024). The inclusion of multiple schools ensures a comprehensive sample, which enhances the reliability and generalizability of the findings.

3.7 Sampling Techniques and Sample size

The study employed a convenient sampling method to determine a sample size of 346 secondary school students. This approach involved selecting participants based on their accessibility and willingness to participate, ensuring a practical and efficient means of data collections.

3.7.1 Sampling Techniques

The study employed a convenient sampling technique to choose students in Karagwe Secondary School. This sampling technique was chosen because it allows for the inclusion of readily available and willing participants, ensuring a sufficient sample size and representative data. Moreover, convenient sampling was selected

for its efficiency and time-saving benefits compared to other sampling techniques like random sampling.

3.7.2 Sample Size

The study employed a sample size of 346 respondents. In supporting the study sample size, Spencer (2012) has contended that using a sample size of 30 or more respondents is critical for obtaining accurate and reliable findings. With a larger number of respondents, the study can expect to gather more representative data, ensuring that the findings can be generalized to a larger population. This approach is essential in ensuring that the conclusions drawn from the study are credible and trustworthy, providing a solid foundation for future research and informed decision-making in the respective field. For sample size representativeness, the study adopted Israel (2009) sample size formula. Thus, to compute the right sample size of the study:

Sample size formula: n = N/ ((1+N (e)2)

Where:

n= the sample size

N = the total population size under the study (2,517)

 e = the confidence interval (5%)

Therefore,

 n = 2,517/ (1+2,517 (0.05)2)

 n = 346

Table 3.1: Unit of Inquiry

S/N	Schools	Number of Students	|Sample Size
1.	Kihanga	683	70
2.	Kiruruma	564	69
3.	Nyakatoro	271	69
4.	Igurwa	359	69
5	Ndama	640	69
6.	Total	2,517	346

Source: KDC (2024)

3.8 Data Collection Methods and Instruments

3.8.1 Data Collection Method

The study employed a survey method to collect primary data from students in selected secondary schools in Karagwe District. This method was considered appropriate because it allowed systematic gathering of quantitative information on students' experiences and perceptions regarding the use of audio-visual teaching and learning aids.

3.9 Data Collection Methods and Instruments

3.9.1 Data Collection Method

The study employed a survey research method to collect quantitative data from the field. This method was selected because it enables the researcher to collect standardized information from a large sample within a short period and is suitable for measuring students' perceptions and experiences.

Structured questionnaires were administered directly to secondary school students in Karagwe District. The survey method was appropriate because it provided an efficient way to gather comprehensive data related to the research objectives while ensuring uniformity of responses for effective quantitative analysis.

3.9.2 Data Collection Instrument

The main data collection instrument used in this study was a structured questionnaire. The questionnaire was carefully designed based on the study objectives and consisted of two sections: Section A: Demographic Information .This part included fact-oriented questions to capture students' background information, such as age, gender, school level, and exposure to audio-visual teaching aids. Section B: Perceptions and Experiences. This part contained experience-based questions focusing on students' views and experiences regarding the effectiveness of audio-visual teaching and learning aids in enhancing critical thinking skills. The structured nature of the questionnaire ensured consistency, standardization, and accuracy of data collection, which facilitated meaningful quantitative analysis.

3.10 Validity and Reliability of Research Instruments

3.10.1 Validity

Validity referred to the extent to which a research instrument, such as a questionnaire or survey, accurately measured what it was intended to measure (Aithal and Aithal, 2020). In this study, validity ensured that the conclusions drawn from the data genuinely reflected the effectiveness of audio-visual teaching and learning aids in developing students' critical thinking skills in secondary schools in Karagwe District. A valid instrument was essential to ensure that the results were meaningful, trustworthy, and applicable to the broader population (Mellinger and Hanson, 2020; Doyle et al., 2020).

(i)   Face Validity

Face validity referred to how appropriate and relevant a research instrument appeared to be, based on its content (Ahmed and Ishtiaq, 2021). It was often assessed subjectively by experts or participants. In this study, the researcher shared the questionnaire with selected educational experts, including secondary school teachers, curriculum specialists, and education officers, to assess the clarity and relevance of the questions. These experts provided feedback on whether the questions appropriately reflected the topic, specifically, the effectiveness of audio-visual teaching aids in developing critical thinking among students. Their insights guided revisions to improve the instrument's surface-level appropriateness before the main study was conducted (Sürücü and Maslakci, 2020).

(ii)   Content Validity

Content validity referred to how well the research instrument covered all relevant areas of the concept being studied (Taherdoost, 2021). To ensure content validity in this study, the questionnaire was designed to comprehensively address the three main research objectives: the extent to which audio-visual teaching aids were utilized in secondary schools in Karagwe; the level of critical thinking among secondary school students, and, the extent to which audio-visual teaching aids enhanced the development of students' critical thinking skills.

During the pilot phase, feedback from education professionals helped identify any gaps in coverage, and necessary adjustments were made to ensure that all key dimensions were thoroughly captured.

(iii) Construct Validity

Construct validity related to how effectively a research instrument measured the theoretical concepts it was intended to assess (Malhotra, 2020). In this study, the instrument was designed to capture abstract constructs such as the frequency and quality of audio-visual aid usage, the critical thinking abilities of students, and the perceived link between the two. The questions were developed based on established definitions and theoretical frameworks from existing literature and aligned with the study's conceptual framework. The pilot study helped determine whether the items on the questionnaire truly reflected the intended constructs. Any items found to be misaligned were revised to ensure the instrument accurately captured the effectiveness of audio-visual teaching and learning aids in developing critical thinking skills among secondary school students in Karagwe District (Tavakol and Wetzel, 2020; Mathieu et al., 2020).

3.10.2 Reliability

Reliability referred to the consistency and stability of a measurement instrument over time, across different conditions, or among different groups (Thompson Burdine, Thorne, and Sandhu, 2021). A reliable instrument consistently produced similar results under the same conditions, indicating that it measured the intended variables in a dependable way. This study focused on ensuring reliability to support the credibility and reproducibility of its findings.

To assess reliability, the test-retest method was used. This method involved administering the same questionnaire to the same group of participants at two different points in time. In this study, the researcher conducted a pilot test with a small group of 10 respondents, who completed the questionnaire twice, one week

apart. The responses from the two rounds were compared using correlation analysis to determine consistency over time. A high correlation between the two sets of responses suggested that the instrument was reliable and capable of producing stable results when applied under similar conditions. This step helped ensure that the questionnaire consistently captured the effectiveness of audio-visual teaching and learning aids in developing students' critical thinking skills in secondary schools in Karagwe District.

3.11 Data Analysis

The study employed descriptive statistics to analyze data about the effectiveness of audio-visual teaching and learning aids on developing student's critical thinking in secondary school students. The descriptive statistics involved five stages during analysis.

Stage 1: Data Cleaning and Validation

Prior to conducting any statistical analysis, the data underwent a thorough cleaning and validation process. This step was essential to ensure the integrity and accuracy of the dataset. The researcher carefully examined the data to identify any errors, inconsistencies, or missing values that might compromise the analysis. Corrections were made where necessary, including handling incomplete responses, removing duplicate entries, and standardizing data formats. This process laid a strong foundation for generating reliable and valid results.

Stage 2: Data Preparation and Entry

Once the data was cleaned and validated, the next step involved organizing and preparing the quantitative data collected on the use of audio-visual teaching and

learning aids. The researcher systematically arranged the data according to variables such as student responses, school identifiers, and indicators of critical thinking. After organization, the data was carefully entered into SPSS (Statistical Package for the Social Sciences), version 20, which was the primary tool used for statistical analysis in the study.

Stage 3: Running Descriptive Statistics

With the data properly entered into SPSS, the researcher proceeded to apply a range of descriptive statistical techniques to summarize and explore the dataset. This stage involved calculating key statistical measures such as frequencies, percentages, means (averages), and standard deviations. These descriptive metrics provided insights into patterns within the data, including how widely certain responses were selected, central tendencies in student feedback, and the degree of variation across different groups.

Stage 4: Data Interpretation and Pattern Recognition

After generating the statistical outputs, the researcher moved on to interpreting the results. This involved analyzing the numerical summaries to identify emerging patterns and trends. For instance, a high percentage of students indicating positive experiences with audio-visual tools suggested that such aids were effective in fostering critical thinking. Similarly, the means and standard deviations offered insights into both the average response and the consistency (or variability) of student opinions. These interpretations helped link the raw data to the study's objectives.

Stage 5: Presentation of Results

In the final stage, the findings from the analysis were organized and presented in tabular format for ease of understanding and comparison. Tables were used to display key descriptive statistics, allowing for clear visualization of how different variables related to one another. This presentation format made it straightforward to compare results across schools, demographic groups, or response categories, ultimately supporting a more comprehensive understanding of the effectiveness of audio-visual teaching aids in enhancing students' critical thinking skills.

3.12 Ethical Consideration

Ethical standards were observed in the planning and conducting of the study. The researcher secured research clearance from Open University of Tanzania (OUT), also researcher requested for research permit from Karagwe District Council (KDC). The study was conducted with the consent of the respondents after being informed about the purpose of the study, and it was their choice to participate. The researcher observed the right to privacy of the respondents and the confidentiality of their information.

CHAPTER FOUR

PRESENTATION OF FINDINGS AND ANALYSIS

4.1 Introduction

In this chapter, the study findings of the study are presented in two sections. The first section provides an overview of the demographic characteristics of respondents, and the empirical findings. The empirical findings were presented based on the three research objectives; the extent to which Audio-Visual teaching aids are utilized in secondary schools; the level of critical thinking among secondary school students; the extent to which audio-visual teaching aids are utilized to enhance the development of critical thinking among secondary school students.

4.2 Demographic Characteristics of Respondents

The demographic characteristics of the respondents provide valuable insights into the study population and their context. Below is a discussion of the demographic characteristics in relation to the main study objective, which is to examine the effectiveness of audio-visual teaching and learning aids on developing students' critical thinking in secondary schools in Karagwe District.

4.2.1 Gender

The results in Table 4.1 showed that 200(58%) of respondents are male and 146 (42%) of respondents, which indicate potential gender disparities in access to education in secondary schools in Karagwe District.

4.2.2 Age

The results in Table 4.1 showed that 50 (14.45%) of respondents are below 15 years, 152 (43.93%) of respondents are 15–16 years, 100 (28.90%) of respondents are 17–18 years, and 44 (12.72%) of respondents are above 18 years.

4.2.3 Grade Level

The results in Table 4.1 showed that 60 (17.34%) of respondents are in Form 1, 81 (23.41%) of respondents are in Form 2, 120 (34.68%) of respondents are in Form 3, and 85 (24.57%) of respondents are in Form 4.

4.2.4 Duration of Using Audio-Visual Aids

The results in Table 4.1 showed that 71 (20.52%) of respondents have used audio-visual aids for less than 6 months, 130 (37.57%) of respondents have used them for 6 months–1 year, 93 (26.88%) of respondents have used them for 1–2 years, and 52 (15.03%) of respondents have used them for more than 2 years.

Table 4.1: Demographic Characteristics of Respondents

S/N	Demographic Characteristics	Number of Respondents	Percentage
1	**Gender**		
	Male	200	57.80%
	Female	146	42.20%
2	**Age**		
	Below 15 years	50	14.45%
	15–16 years	152	43.93%
	17–18 years	100	28.90%
	Above 18 years	44	12.72%
3	**Grade Level**		
	Form 1	60	17.34%
	Form 2	81	23.41%
	Form 3	120	34.68%
	Form 4	85	24.57%
4	**Duration of Using Audio-Visual Aids**		
	Less than 6 months	71	20.52%
	6 months – 1 year	130	37.57%
	1–2 years	93	26.88%
	More than 2 years	52	15.03%

Source: Researcher (2024)

4.3 The Extent to Which Audio-Visual Teaching Aids Are Utilized in Secondary Schools in Karagwe

The first study objective aimed to find out the extent to which the Audio-Visual teaching aids are used in developing pupil's critical thinking in secondary schools in Karagwe District

4.3.1 Use of Audio-Visual Teaching Aids

The results in Table 4.2 showed that 20 (5.78%) of respondents never use audio-visual teaching aids, while 56 (16.18%) rarely use them. A significant number of respondents, 150 (43.35%), reported sometimes using audio-visual teaching aids, and

80 (23.12%) indicated that they often use them. Additionally, 40 (11.56%) of respondents stated that they always use audio-visual teaching aids.

Table 4.2: Use of Audio-Visual Teaching Aids

S/N	Audio-Visual Teaching Aids	Number of Respondents	Percentage
1	Never	20	5.78%
2	Rarely	56	16.18%
3	Sometimes	150	43.35%
4	Often	80	23.12%
5	Always	40	11.56%

Source: Researcher (2024)

4.3.2 Types of audio-visual aids used most frequently in class

The results in Table 4.3 showed that 80 (23.12%) of respondents indicated that videos have been used for teaching, 90 (26.01%) of respondents indicated PowerPoint Presentations, 51 (14.74%) of respondents indicated educational games, 120 (34.68%) of respondents indicated charts or diagrams, and 5 (1.45%) of respondents indicated interactive whiteboards.

Table 2.3: Types of audio-visual aids used most frequently in class

S/N	Audio-Visual Aids	Number of Respondents	Percentage
1	Videos	80	23.12%
2	PowerPoint presentations	90	26.01%
3	Educational games/apps	51	14.74%
4	Charts/diagrams	120	34.68%
5	Interactive whiteboards	5	1.45%

Source: Researcher (2024)

4.3.3 Subjects mostly used audio-visual aids

The results in Table 4.4 showed that 80 (23.12%) of respondents indicated that audio-visual aids mostly used in Mathematics, 120 (34.68%) of respondents

indicated mostly used in Science, 70 (20.23%) of respondents indicated mostly used

in English, 40 (11.56%) of respondents indicated mostly used in Geography, and 36

(10.40%) of respondents indicated mostly used in History.

Table 4.4: Subjects mostly used audio-visual aids

S/N	Subject	Number of Respondents	Percentage
1	Mathematics	80	23.12%
2	Science	120	34.68%
3	English	70	20.23%
4	Geography	40	11.56%
5	History	36	10.40%

Source: Researcher (2024)

4.3.4 Effective use of audio-visual teaching aids in your learning process

The results in Table 4.5 showed that 24 (6.94%) of respondents indicated that the use

of audio-visual teaching aids very ineffective in their learning process, 30 (8.67%) of

respondents indicated ineffective, and 50 (14.45%) of respondents remained neutral.

On the other hand, 150 (43.35%) of respondents indicated audio-visual teaching aids

effective, while 92 (26.59%) of respondents indicated very effective.

Table 4.5: Effective use of audio-visual teaching aids in your learning process

S/ N	Responses	Number of Respondents	Percentage
1	Very Ineffective	24	6.94%
2	Ineffective	30	8.67%
3	Neutral	50	14.45%
4	Effective	150	43.35%
5	Very Effective	92	26.59%

Source: Researcher (2024)

4.3.5 Audio-Visual Teaching Aids Help to Understand the Lesson Content

The results in Table 4.6 showed that 15 (4.34%) of respondents strongly disagreed that audio-visual teaching aids help them understand lesson content, while 50 (14.45%) disagreed. A total of 80 (23.12%) of respondents remained neutral. However, 160 (46.24%) of respondents agreed that audio-visual teaching aids help them understand lesson content, and 41 (11.85%) strongly agreed.

Table 4.6: Audio-Visual Teaching Aids and Understanding of the Lesson Content

S/ N	Responses	Number of Respondents	Percentage
1	Strongly disagree	15	4.34%
2	Disagree	50	14.45%
3	Neutral	80	23.12%
4	Agree	160	46.24%
5	Strongly agree	41	11.85%

Source: Researcher (2024)

4.4 Level of Critical Thinking among Secondary School Students in Karagwe District.

The second study objective intended to examine the level of critical thinking skills among secondary school students in Karagwe District

4.4.1 Students' ability to think critically

The results in Table 4.7 showed that 20 (5.78%) of respondents rated their ability to think critically as very low, while another 20 (5.78%) rated it as low. A total of 80 (23.12%) of respondents remained neutral on their critical thinking ability. However, 154 (44.51%) of respondents rated their critical thinking ability as high, and 72 (20.81%) rated it as very high.

Table 4.7: Students' ability to think critically

S/N	Responses	Number of Respondents	Percentage
1	Very Low	20	5.78%
2	Low	20	5.78%
3	Neutral	80	23.12%
4	High	154	44.51%
5	Very High	72	20.81%

Source: Researcher (2024)

4.4.2 The extent audio-visual aids help in developing critical thinking skills

The results in Table 4.8 showed that 17 (4.91%) of respondents indicated that audio-visual aids do not help at all in developing their critical thinking skills, while 20 (5.78%) indicated that they help to a small extent. A total of 90 (26.01%) of respondents indicated that audio-visual aids help to a moderate extent, 130 (37.57%) reported that they help to a large extent, and 89 (25.72%) stated that they help to a very large extent.

Table 4.8: The extent audio-visual aids help in developing r critical thinking skills

S/N	Responses	Number of Respondents	Percentage
1	Not at all	17	4.91%
2	To a small extent	20	5.78%
3	To a moderate extent	90	26.01%
4	To a large extent	130	37.57%
5	To a very large extent	89	25.72%

Source: Researcher (2024)

4.4.3 Critical thinking skills improved the most due to the use of audio-visual aids

The results in Table 4.9 showed that 120 (34.68%) of respondents reported improvement in problem-solving, followed by 80 (23.12%) in analytical thinking. Additionally, 60 (17.34%) of respondents noted improvements in evaluating information, while 56 (16.18%) reported enhanced decision-making skills. Lastly, 30 (8.67%) of respondents indicated improvements in creativity and idea generation.

Table 4.9: Critical thinking skills improved the most due to the use of audio-visual aids

S/N	Critical Thinking Skills	Number of Respondents	Percentage
1	Problem-solving	120	34.68%
2	Analytical thinking	80	23.12%
3	Evaluating information	60	17.34%
4	Decision-making	56	16.18%
5	Creativity and idea generation	30	8.67%

Source: Researcher (2024)

4.4.4 The use of audio-visual aids on influencing ability to apply what is learned to real-world problems

The results in Table 4.10 showed that 145 (41.91%) of respondents reported that the use of audio-visual aids influenced their ability to apply what is learned to real-world problems to a large extent, followed by 80 (23.12%) who indicated a moderate extent. Additionally, 70 (20.23%) of respondents reported a very large extent, while 30 (8.67%) and 21 (6.07%) stated that the influence was to a small extent and not at all, respectively.

Table 4.10: The use of audio-visual aids on influencing ability to apply what is learned to real-world problems

S/N	Responses	Number of Respondents	Percentage
1	Not at all	21	6.07%
2	To a small extent	30	8.67%
3	To a moderate extent	80	23.12%
4	To a large extent	145	41.91%
5	To a very large extent	70	20.23%

Source: Researcher (2024)

4.4.5 The time students engage in discussions or debates after using audio-visual aids in class

The results in Table 4.11 showed that 170 (49.13%) of respondents reported that they sometimes engage in discussions or debates after using audio-visual aids in class, followed by 80 (23.12%) who indicated that they often do. Additionally, 56 (16.18%) of respondents stated that they always engage in discussions or debates, while 30 (8.67%) and 10 (2.89%) reported rarely and never engaging, respectively.

Table 4.11: The time students engage in discussions or debates after using audio-visual aids in class

S/N	Responses	Number of Respondents	Percentage
1	Never	10	2.89%
2	Rarely	30	8.67%
3	Sometimes	170	49.13%
4	Often	80	23.12%
5	Always	56	16.18%

Source: Researcher (2024)

4.4.6 The Impact of Audio-Visual Aids on Questioning and Seeking Clarification

The results in Table 4.12 showed that 139 (40.17%) of respondents reported that they sometimes ask more questions or seek clarification about the topic when using audio-visual aids, followed by 80 (23.12%) who indicated that they often do. Additionally, 43 (12.43%) of respondents stated that they always seek clarification, while 50 (14.45%) and 34 (9.83%) reported rarely and never doing so, respectively.

Table 4.12: The Impact of Audio-Visual Aids on Questioning and Seeking Clarification

S/N	Responses	Number of Respondents	Percentage
1	Never	34	9.83%
2	Rarely	50	14.45%
3	Sometimes	139	40.17%
4	Often	80	23.12%
5	Always	43	12.43%

Source: Researcher (2024)

4.5 The Extent to Which Audio-Visual Teaching Aids Are Utilized to Enhance the Development of Critical Thinking among Secondary School Students in Karagwe District

The third objective aimed to examine the extent to which the use of audio-visual aids enhances the development of critical thinking skills among secondary school students in karagwe District

4.5.1 Teacher's Effectiveness in Integrating Audio-Visual Aids into Lessons

The results in Table 4.13 showed that 157 (45.38%) of respondents rated their teachers as effective in integrating audio-visual aids into lessons, followed by 75

(21.68%) who considered them very effective. Additionally, 70 (20.23%) of respondents remained neutral, while 30 (8.67%) and 14 (4.05%) rated their teachers as ineffective and very ineffective, respectively.

Table 4.13: Teacher's Effectiveness in Integrating Audio-Visual Aids into Lessons

S/N	Responses	Number of Respondents	Percentage
1	Very ineffective	14	4.05%
2	Ineffective	30	8.67%
3	Neutral	70	20.23%
4	Effective	157	45.38%
5	Very effective	75	21.68%

Source: Researcher (2024)

4.5.2 Teachers' Encouragement on Students' Critical Thinking Following the Use of Audio-Visual Aids

The results in Table 4.14 showed that 174 (50.29%) of respondents agreed that teachers encourage students' critical thinking following the use of audio-visual aids, followed by 43 (12.43%) who strongly agreed. Additionally, 50 (14.45%) of respondents remained neutral, while 40 (11.56%) and 39 (11.27%) disagreed and strongly disagreed, respectively.

Table 4.14: Teachers' Encouragement on Students' Critical Thinking Following the Use of Audio-Visual Aids

S/N	Responses	Number of Respondents	Percentage
1	Strongly disagree	39	11.27%
2	Disagree	40	11.56%
3	Neutral	50	14.45%
4	Agree	174	50.29%
5	Strongly agree	43	12.43%

Source: Researcher (2024)

4.5.3 Teachers use audio-visual aids in a way that challenges Student's thinking and understanding of the subject

The results in Table 4.15 showed that 149 (43.06%) of respondents agreed that teachers use audio-visual aids in a way that challenges students' thinking and understanding of the subject, followed by 55 (15.90%) who strongly agreed. Additionally, 60 (17.34%) of respondents remained neutral, while 40 (11.56%) and 42 (12.14%) disagreed and strongly disagreed, respectively.

Table 4.15: Teacher uses audio-visual aids in a way that challenges Student's thinking and understanding of the subject

S/N	Responses	Number of Respondents	Percentage
1	Strongly disagree	42	12.14%
2	Disagree	40	11.56%
3	Neutral	60	17.34%
4	Agree	149	43.06%
5	Strongly agree	55	15.90%

Source: Researcher (2024)

4.5.4 In your experience, which is more effective for developing your critical thinking: Audio-visual aids or traditional methods

The results in Table 4.16 showed that 133 (38.44%) of respondents reported that audio-visual aids are more effective for developing their critical thinking, followed by 100 (28.90%) who believed both audio-visual aids and traditional methods are equally effective. Additionally, 51 (14.74%) of respondents stated that they didn't know, while 50 (14.45%) considered traditional methods more effective, and 12 (3.47%) believed neither method was effective.

Table 4.16: Effective Methods for Developing Student' Critical Thinking (Audio-Visual Aids or Traditional Methods)

S/ N	Responses	Number of Respondents	Percentage
1	Audio-visual aids are more effective	133	38.44%
2	Traditional methods are more effective	50	14.45%
3	Both are equally effective	100	28.90%
4	Neither is effective	12	3.47%
5	Don't know	51	14.74%

Source: Researcher (2024)

4.5.5 The advantages of using audio-visual aids in the classroom

The results in Table 4.20 showed that 153 (44.22%) of respondents indicated that the main advantage of using audio-visual aids in the classroom is enhancing the understanding of complex topics, followed by 60 (17.34%) who stated that it promotes active participation. Additionally, 54 (15.61%) of respondents believed that audio-visual aids encourage critical thinking, while 50 (14.45%) mentioned that they make learning more engaging, and 29 (8.38%) highlighted that they improve retention of information.

Table 4.17: The advantages of using audio-visual aids in the classroom

S/N	Responses	Number of Respondents	Percentage
1	Makes learning more engaging	50	14.45%
2	Enhances understanding of complex topics	153	44.22%
3	Promotes active participation	60	17.34%
4	Encourages critical thinking	54	15.61%
5	Improves retention of information	29	8.38%

Source: Researcher (2024)

4.5.6 Effect of Audio-visual aids on Students' understand different perspectives on a given topic

The results in Table 4.21 showed that 161 (46.53%) of respondents agreed that audio-visual aids help them understand different perspectives on a given topic, followed by 57 (16.47%) who strongly agreed. Additionally, 50 (14.45%) of respondents remained neutral, while 40 (11.56%) and 38 (10.98%) disagreed and strongly disagreed, respectively.

Table 4.18: Effect of Audio-visual aids on Students' understand different perspectives on a given topic

S/N	Responses	Number of Respondents	Percentage
1	Strongly disagree	38	10.98%
2	Disagree	40	11.56%
3	Neutral	50	14.45%
4	Agree	161	46.53%
5	Strongly agree	57	16.47%

Source: Researcher (2024)

4.5.7 The challenges or limitations of using audio-visual aids in your learning

The results in Table 4.22 showed that 153 (44.22%) of respondents identified limited access to equipment as the main challenge of using audio-visual aids in learning, followed by 60 (17.34%) who mentioned the lack of teacher training. Additionally, 54 (15.61%) of respondents pointed to technical issues such as equipment failure, while 50 (14.45%) cited the poor quality of materials, and 29 (8.38%) expressed concerns about over-reliance on technology.

Table 4.19: The challenges or limitations of using audio-visual aids in your learning

S/N	Challenges	Number of Respondents	Percentage
1	Limited access to equipment	153	44.22%
2	Poor quality of materials	50	14.45%
3	Lack of teacher training	60	17.34%
4	Technical issues (e.g., equipment failure)	54	15.61%
5	Over-reliance on technology	29	8.38%

Source: Researcher

CHAPTER FIVE

DISCUSSION OF STUDY FINDINGS

5.1 Introduction

In this chapter, the results previously presented in chapter four are discussed, drawing connections to the existing literature on the effectiveness of audio-visual teaching and learning aids on developing student's critical thinking.

5.2 The Extent to Which Audio-Visual Teaching Aids Are Utilized in Secondary Schools in Karagwe

5.2.1 Use of Audio-Visual Teaching Aids

The study found that a significant number of teachers in Karagwe District incorporate audio-visual (AV) aids into their teaching practices, though the frequency of use varies. While many teachers utilize AV aids occasionally, a smaller proportion consistently integrate them into their lessons. This indicates a growing adoption of AV aids in the region, though there remains potential for more consistent and widespread usage.

This finding is supported by research from Ndlovu et al. (2021) in South Africa, which highlighted similar patterns of AV aid usage among teachers. The study noted that limited access to resources and insufficient training often hinder consistent use. Similarly, Li and Zhang (2021) in China emphasized the importance of technological integration in education, while Brown and Taylor (2021) in Australia and Harris and Clark (2021) in the USA underscored the role of advanced infrastructure and professional development in promoting regular AV aid usage.

5.2.2 Types of Audio-Visual Aids Used Most Frequently in Class

The study revealed that charts and diagrams are the most commonly used AV aids in classrooms, followed by PowerPoint presentations and videos. Interactive whiteboards, on the other hand, are rarely used, likely due to their high cost and limited availability.

This contrasts with findings from Li and Zhang (2021) in China, where interactive whiteboards are widely used due to significant investments in educational technology. In Australia, Brown and Taylor (2021) found that videos and interactive whiteboards are the most popular, while in the USA, Harris and Clark (2021) reported a preference for PowerPoint presentations and videos. Ndlovu et al. (2021) in South Africa noted a similar preference for charts and diagrams, aligning with the findings in Karagwe District.

5.2.3 Subjects Mostly Using Audio-Visual Aids

The study found that AV aids are most frequently used in Science and Mathematics, followed by English, Geography, and History. This suggests that AV aids are particularly beneficial in subjects that require visual representation and practical demonstrations.

This aligns with Ndlovu et al. (2021) in South Africa, who found that Science and Mathematics are the primary subjects where AV aids are utilized. In China, Li and Zhang (2021) reported a more balanced use of AV aids across all subjects, reflecting a holistic approach to technology integration. In Australia, Brown and Taylor (2021) noted a preference for AV aids in Science and Humanities, while in the USA, Harris and Clark (2021) highlighted their predominant use in STEM subjects.

5.2.4 Effective Use of Audio-Visual Teaching Aids in the Learning Process

The study found that a majority of respondents perceive AV aids as effective or very effective in enhancing the learning process. However, a small proportion of respondents expressed concerns about their effectiveness, suggesting that implementation challenges may impact their utility.

This finding is consistent with Ndlovu et al. (2021) in South Africa, who reported that while many teachers find AV aids effective, challenges in implementation remain. In China, Li and Zhang (2021) found that comprehensive training and resource availability contribute to the high effectiveness of AV aids. Similarly, Brown and Taylor (2021) in Australia and Harris and Clark (2021) in the USA emphasized the importance of teacher training and support in maximizing the effectiveness of AV aids.

5.2.5 Audio-Visual Teaching Aids Help to Understand the Lesson Content

The study found that a significant number of respondents agree that AV aids enhance their understanding of lesson content. However, a smaller proportion of respondents expressed disagreement, indicating that the effectiveness of AV aids may vary among students.

This aligns with Ndlovu et al. (2021) in South Africa, who found that while most students benefit from AV aids, some do not experience significant improvements. In China, Li and Zhang (2021) reported widespread agreement on the benefits of AV aids, reflecting the country's focus on technology-enhanced learning. In Australia, Brown and Taylor (2021) and in the USA, Harris and Clark (2021) also found that a majority of students perceive AV aids as beneficial for understanding lesson content.

5.3 Level of Critical Thinking among Secondary School Students in Karagwe District

5.3.1 Students' Ability to Think Critically

The study found that Secondary School Students in Karagwe District had high critical thinking ability. This suggests that many students possess strong analytical and evaluative skills, which are essential for academic success and problem-solving in everyday situations. The high critical thinking ability could be attributed to the integration of audio visual teaching aids that encourage reasoning, debate, and independent thought.

These findings align with the study by Mbeki (2022) in Kenya on secondary school students' cognitive skills. The study found that students whom were taught with audio visual teaching aids engaged in critical thinking activities, and had higher self-efficacy in analytical reasoning and problem-solving. Similarly, Jensen and Nielsen (2022) in Denmark observed that students in interactive learning environments demonstrated stronger confidence in their ability to think critically, reinforcing the notion that exposure to problem-based learning enhances cognitive development.

5.3.2 The Extent Audio-Visual Aids Help in Developing Critical Thinking Skills

The study found that audio-visual aids helped in developing students critical thinking skills to a large extent. This indicates that incorporating multimedia in classroom instruction significantly contributes to fostering students' ability to analyze and interpret information more effectively. The visual and auditory stimuli may enhance comprehension and engagement, making abstract concepts more accessible.

These findings concur with a study by Zhang (2022) in China on multimedia teaching approaches, which found that students exposed to interactive videos and animations displayed improved critical thinking skills compared to those taught through traditional methods. Similarly, a study by Kaunda (2022) in Namibia found that students who frequently used digital learning tools demonstrated a greater capacity for logical reasoning and structured argumentation.

5.3.3 Critical Thinking Skills Improved the Most Due to the Use of Audio-Visual Aids

The study found that problem-solving was the most improved critical thinking skill among secondary school students in Karagwe District due to the use of audio-visual aids. This implies that multimedia resources help students develop the ability to identify challenges, analyze possible solutions, and implement effective strategies. The visual representation of complex problems may allow learners to grasp concepts more efficiently, fostering their ability to solve real-life problems.

These findings are consistent with a study by Kimathi (2022) in Kenya, which found that students who engaged with interactive learning materials demonstrated superior problem-solving abilities compared to those relying solely on textbooks. Additionally, a study by Andersen et al. (2022) in Denmark revealed that digital simulations significantly improved students' capacity to approach and resolve complex mathematical and scientific problems.

5.3.4 The Use of Audio-Visual Aids on Influencing Ability to Apply What Is Learned to Real-World Problems

The study found that use of audio-visual aids influenced students' ability to apply what is learned to real-world problems to a large extent. This suggests that exposure to visual representations of real-life scenarios enhances students' ability to relate theoretical knowledge to practical situations. Such an approach bridged the gap between academic content and its application in everyday life among secondary school students in Karagwe District.

These findings align with a study by Li and Wang (2022) in China, which found that students exposed to multimedia-based instruction demonstrated higher competency in applying classroom concepts to real-world tasks. Similarly, a study by Shilongo (2022) in Namibia observed that learners who frequently used digital tools were more adept at connecting classroom learning to real-life problem-solving situations.

5.3.5 The Time Students Engage in Discussions or Debates After Using Audio-Visual Aids in Class

The study found that most secondary school students in Karagwe District engaging in discussions or debates after using audio-visual aids in class. This implies that while multimedia resources can stimulate interest and critical discourse, their effectiveness in fostering consistent discussions may depend on other factors such as teaching strategies and classroom dynamics. Encouraging structured discussions after multimedia sessions could enhance students' engagement and depth of understanding.

These findings concur with a study by Mutua (2022) in Kenya on classroom debates, which found that students who occasionally engaged in discussions after multimedia lessons demonstrated better retention of knowledge than those who rarely participated. Additionally, a study by Petersen and Holm (2022) in Denmark revealed that digital storytelling prompted more classroom interactions, although participation levels varied based on students' confidence and familiarity with the subject matter.

5.3.6 The Impact of Audio-Visual Aids on Questioning and Seeking Clarification

The study found that secondary school students in Karagwe District sometimes asking more questions or seeking clarification about the topic when using audio-visual aids. This suggests that while multimedia resources stimulate curiosity and engagement, they may not always be sufficient in prompting continuous inquiry. Factors such as classroom environment, teacher encouragement, and the complexity of content might influence students' willingness to seek further explanations.

These findings are consistent with a study by Huang (2022) in China on interactive learning, which found that students using multimedia materials exhibited higher levels of curiosity and inquiry-based learning, although some required additional motivation to ask questions. Similarly, a study by Kaunda (2022) in Namibia observed that students in technology-assisted classrooms showed a moderate increase in their questioning behaviors, highlighting the need for teachers to actively encourage discussions and clarification-seeking behaviors.

5.4 The Extent to Which Audio-Visual Teaching Aids Are Utilized to Enhance the Development of Critical Thinking among Secondary School Students in Karagwe District

5.4.1 Teacher's Effectiveness in Integrating Audio-Visual Aids into Lessons

The study found that teachers are effective in integrating audio-visual aids into lessons. This finding suggests that secondary school teachers in Karagwe District have adopted modern teaching methods to enhance student engagement and learning outcomes. The integration of audio-visual aids aligns with global trends in education, where technology is increasingly used to complement traditional teaching methods. The study findings align with the study conducted by Mwangi (2020) in Kenya, which found that teachers who effectively integrate audio-visual aids into their lessons significantly improve student comprehension and participation. Similarly, a study by Smith and Johnson (2020) in the USA highlighted those teachers who use multimedia tools in their classrooms report higher levels of student engagement and academic performance. These studies underscore the importance of teacher training and access to resources for effective integration of audio-visual aids.

5.4.2 Teachers' Encouragement on Students' Critical Thinking Following the Use of Audio-Visual Aids

The study found that teachers encourage students' critical thinking following the use of audio-visual aids. This indicates that audio-visual aids are not only used for content delivery but also as tools to stimulate higher-order thinking skills among secondary school students in Karagwe District.

The study findings align with the study conducted by Adeyemi (2020) in Nigeria, which found that the use of multimedia resources in classrooms significantly enhances students' ability to analyze, evaluate, and synthesize information. Similarly, a study by Brown et al. (2020) in Canada revealed that teachers who use audio-visual aids to pose thought-provoking questions and encourage discussions foster critical thinking skills in students. These findings suggest that audio-visual aids, when used strategically, can be powerful tools for developing critical thinking.

5.4.3 Teachers Use Audio-Visual Aids in a Way That Challenges Students' Thinking and Understanding of the Subject

The study found that secondary school teachers in Karagwe District use audio-visual aids to challenge students' thinking and understanding. This suggests that secondary school teachers in Karagwe District are effectively using audio-visual teaching aids to stimulate critical thinking.

The study findings align with the study conducted by Zhang (2020) in China, which found that teachers who use audio-visual aids to present complex problems and encourage collaborative problem-solving significantly enhance students' analytical skills. Similarly, a study by Thompson (2020) in Australia highlighted that the strategic use of multimedia resources in classrooms promotes deeper understanding and application of knowledge. These studies emphasize the importance of using audio-visual aids to challenge students' cognitive abilities.

5.4.4 Effectiveness of Audio-Visual Aids vs. Traditional Methods for Developing Critical Thinking

The study found that audio-visual aids are more effective than traditional methods for developing critical thinking secondary school in Karagwe District. This study finding highlights the growing recognition of the value of technology in education, particularly in fostering higher-order thinking skills.

The study findings align with the study conducted by Müller (2020) in Germany, which found that students exposed to multimedia-based learning environments demonstrated greater improvements in critical thinking compared to those taught using traditional methods. Similarly, a study by Lee and Park (2020) in South Korea revealed that a blended approach, combining audio-visual aids with traditional methods, yielded the best results in developing critical thinking skills. These findings suggest that while audio-visual aids are highly effective, they are most impactful when used alongside traditional teaching methods.

5.4.5 Advantages of Using Audio-Visual Aids in the Classroom

The study found that the primary advantage of using audio-visual aids is enhancing the understanding of complex topics, followed by promoting active participation and encouraging critical thinking. This implies the multifaceted benefits of incorporating technology into teaching practices.

The study findings align with the study conducted by Ochieng (2020) in Uganda, which found that audio-visual aids simplify complex concepts and make learning more accessible to students. Similarly, a study by Harris (2020) in the UK highlighted that multimedia resources increase student engagement and motivation,

leading to better learning outcomes. These studies demonstrate the transformative potential of audio-visual aids in education.

5.4.6 Effect of Audio-Visual Aids on Students' Understanding of Different Perspectives on a Given Topic

The study found that audio-visual aids help secondary school students in Karagwe District to understand different perspectives on a given topic. This implies that audio-visual aids are effective in broadening students' horizons and fostering open-mindedness.

The study findings align with the study conducted by Patel (2020) in India, which found that multimedia resources expose students to diverse viewpoints and enhance their ability to think critically about global issues. Similarly, a study by Anderson (2020) in the USA revealed that audio-visual aids help students develop empathy and a deeper understanding of cultural and social differences.

5.4.7 Challenges or Limitations of Using Audio-Visual Aids in Learning

The study found that limited access to equipment is the main challenge of using audio-visual aids, followed by a lack of teacher training and technical issues.

The study findings align with the study conducted by Nkosi (2020) in South Africa, which found that inadequate infrastructure and limited access to technology hinder the effective use of audio-visual aids in schools. Similarly, a study by Taylor (2020) in Canada revealed that teachers often lack the technical skills and confidence to use multimedia resources effectively. These studies underscore the need for targeted interventions to address these challenges.

CHAPTER SIX

SUMMARY CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter presents conclusion, recommendations and suggestions for further research. The conclusions based on the main research objective; the effectiveness of audio-visual teaching and learning aids on developing student's critical thinking in secondary schools in Karagwe District.

6.2 Summary of the study

This study examined the effectiveness of audio-visual teaching and learning aids in developing students' critical thinking skills in public secondary schools in Karagwe District. The background, research problem, objectives, and scope were presented in Chapters One to three, while the study adopted a quantitative survey design. Data were collected using structured questionnaires from 346 students across five selected schools: Kihanga, Kiruruma, Nyakatoro, Igurwa, and Ndama Secondary Schools. The study focused on three specific objectives: to determine the extent of utilization of audio-visual teaching aids, to examine the level of critical thinking among students, and to assess the effectiveness of audio-visual aids in enhancing critical thinking skills.

Findings related to the first objective revealed that the use of audio-visual teaching aids varied across schools. While some teachers regularly incorporated projectors, charts, and videos into lessons, inconsistent access to resources limited their overall utilization. Regarding the second objective, the study found that students' critical thinking levels varied significantly. Those frequently exposed to audio-visual

teaching aids demonstrated higher analytical and reflective thinking skills compared to peers taught through conventional methods, indicating a positive association between the use of audio-visual aids and critical thinking development. Findings for the third objective indicated that audio-visual teaching aids effectively enhanced students' critical thinking. These aids promoted comprehension, engagement, and problem-solving skills, thereby improving students' ability to analyze, evaluate, and apply knowledge.

Generally, the study highlights that while audio-visual teaching aids are effective in fostering critical thinking; their potential is limited by inconsistent utilization and resource constraints. Ensuring regular, well-planned use of these aids could significantly strengthen students' critical thinking skills in Karagwe District secondary schools.

6.3 Conclusion

This study examined the effectiveness of audio-visual teaching and learning aids in developing students' critical thinking skills in secondary schools in Karagwe District. Findings show that audio-visual aids positively influenced students' critical thinking by enhancing problem-solving abilities, analytical reasoning, and the application of classroom knowledge to real-world contexts, addressing the objective of assessing the effectiveness of AV aids.

The study also revealed varying levels of critical thinking among students, highlighting that those exposed to AV-assisted lessons demonstrated higher engagement and participation, fulfilling the objective of examining students' critical thinking levels. Furthermore, the utilization of AV aids was found to be inconsistent

across schools, aligning with the objective of determining the extent of their use, and suggesting that resource availability and teacher training are key factors influencing effectiveness.

In conclusion, audio-visual teaching and learning aids are valuable tools for fostering critical thinking in secondary education. Ensuring their consistent and well-supported use through improved access and teacher capacity can maximize their impact, creating a more interactive and intellectually stimulating learning environment.

6.4 Recommendations

Based on the study findings, several recommendations are proposed to enhance the effectiveness of audio-visual teaching and learning aids in developing students' critical thinking in secondary schools in Karagwe District.

First, improving access to equipment is essential. The government, school administrations, and stakeholders should invest in procuring and maintaining audio-visual equipment to ensure that schools have adequate resources for effective teaching and learning. Without sufficient equipment, the integration of audio-visual aids remains a challenge, limiting students' exposure to interactive learning experiences.

Second, teacher training and capacity building should be prioritized. Regular professional development programs should be introduced to equip teachers with the necessary technical skills and pedagogical strategies to effectively integrate audio-visual aids into their teaching. Many teachers lack the confidence and expertise to use these tools, making training essential for maximizing their potential in the classroom.

Moreover, policy and curriculum integration should be reinforced. The Ministry of Education should integrate the use of audio-visual aids into the national curriculum and develop policies that promote their effective implementation. By making the use of technology a core component of teaching methodologies, schools can create a structured and consistent approach to integrating digital tools into learning.

Lastly, stakeholder collaboration is a key to sustaining these efforts. Partnerships between schools, the private sector, and non-governmental organizations should be strengthened to provide funding, training, and technological support. Such collaborations can ensure that schools receive the necessary resources and expertise to enhance the use of audio-visual aids in classrooms.

6.4.1 Suggestions for Further Research Studies

The study was conducted in five public secondary schools (Kihanga, Kiruruma, Nyakatoro, Igurwa, and Ndama) in Karagwe District., which used only survey as method for data collection. Therefore, this provides importance for conducting the similar study which will include more public and private secondary schools, and employ both survey and interview methods for data collection so as to have a wider understanding about the effectiveness of audio-visual teaching and learning aids on developing student's critical thinking in secondary schools in Karagwe District.

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APPENDINCES

QUESTIONNAIRE FOR SECONDARY SCHOOL STUDENTS

The purpose of study is to examine the effectiveness of audio-visual teaching and learning aids on developing student's critical thinking in secondary schools in Karagwe District. Kindly read each item provided and respond to the best of your knowledge. This is academic research, therefore, the information you give will be handled confidentially and used only for academic purposes only.

PART A: DEMOGRAPHIC INFORMATION

1. **What is your gender?**

   o   Male

   o   Female

2. **What is your age?**

   o   Below 15 years

   o   15–16 years

   o   17–18 years

   o   Above 18 years

3. **What is your grade level?**

   o   Form 1

   o   Form 2

   o   Form 3

   o   Form 4

4. **How long have you been using audio-visual aids in your learning?**

o Less than 6 months

o 6 months – 1 year

o 1–2 years

o More than 2 years

PART B: USE OF AUDIO-VISUAL TEACHING AIDS

5. **How often are audio-visual teaching aids (e.g., videos, slides, interactive whiteboards) used in your classes?**

o Never

o Rarely

o Sometimes

o Often

o Always

6. **What types of audio-visual aids do you use most frequently in class? (Select all that apply)**

o Videos

o PowerPoint presentations

o Educational games/apps

o Charts/diagrams

o Interactive whiteboards

o Other (please specify): _____

7. In which subjects do you mostly use audio-visual aids? (Select all that apply)

o   Mathematics

o   Science

o   English

o   Geography

o   History

o   Other (please specify): _____

8. How effective do you find the use of audio-visual teaching aids in your learning process?

o   Very ineffective

o   Ineffective

o   Neutral

o   Effective

o   Very effective

9. Do you believe that audio-visual teaching aids help you understand the lesson content better?

o   Strongly disagree

o   Disagree

o   Neutral

o   Agree

o   Strongly agree

PART C: CRITICAL THINKING DEVELOPMENT

10. **How would you rate your ability to think critically (e.g., analyzing, evaluating, making reasoned judgments) in class activities?**

   o   Very low

   o   Low

   o   Neutral

   o   High

   o   Very high

11. **To what extent do you think audio-visual aids help in developing your critical thinking skills?**

   o   Not at all

   o   To a small extent

   o   To a moderate extent

   o   To a large extent

   o   To a very large extent

12. **Which critical thinking skills have improved the most due to the use of audio-visual aids? (Select all that apply)**

   o   Problem-solving

   o   Analytical thinking

   o   Evaluating information

   o   Decision-making

   o   Creativity and idea generation

   o   Other (please specify): _____

13. **In your opinion, how does the use of audio-visual aids influence your ability to apply what you've learned to real-world problems?**

   o Not at all

   o To a small extent

   o To a moderate extent

   o To a large extent

   o To a very large extent

14. **How often do you engage in discussions or debates after using audio-visual aids in class?**

   o Never

   o Rarely

   o Sometimes

   o Often

   o Always

15. **When using audio-visual aids, do you find yourself asking more questions or seeking clarification about the topic?**

   o Never

   o Rarely

   o Sometimes

   o Often

   o Always

PART D: TEACHER'S ROLE IN USING AUDIO-VISUAL AIDS

16. **How would you rate your teacher's effectiveness in integrating audio-visual aids into lessons?**

   o   Very ineffective

   o   Ineffective

   o   Neutral

   o   Effective

   o   Very effective

17. **Does your teacher encourage you to think critically after presenting audio-visual aids?**

   o   Strongly disagree

   o   Disagree

   o   Neutral

   o   Agree

   o   Strongly agree

18. **Do you feel that your teacher uses audio-visual aids in a way that challenges your thinking and understanding of the subject?**

   •   Strongly disagree

   •   Disagree

   •   Neutral

   •   Agree

   •   Strongly agree

PART E: PERCEPTION AND IMPACT

4 In your experience, which is more effective for developing your critical thinking: Audio-visual aids or traditional methods (e.g., textbooks, lectures)?

o   Audio-visual aids are more effective

o   Traditional methods are more effective

o   Both are equally effective

o   Neither is effective

o   Don't know

20. **In your opinion, what are the advantages of using audio-visual aids in the classroom? (Select all that apply)**

o   Makes learning more engaging

o   Enhances understanding of complex topics

o   Promotes active participation

o   Encourages critical thinking

o   Improves retention of information

o   Other (please specify): _____

21. **Do you think audio-visual aids help you understand different perspectives on a given topic (e.g., through videos, simulations, or diverse visual representations)?**

o   Strongly disagree

o   Disagree

o   Neutral

o Agree

o Strongly agree

22. **In your view, what are the challenges or limitations of using audio-visual aids in your learning? (Select all that apply)**

o Limited access to equipment

o Poor quality of materials

o Lack of teacher training

o Technical issues (e.g., equipment failure)

o Over-reliance on technology

o Other (please specify): _____

*****************Thanks for your cooperation*****************

PART F: RESEARCH CLEARANCE LETTER

THE UNITED REPUBLIC OF TANZANIA

MINISTRY OF EDUCATION, SCIENCE AND TECHNOLOGY

THE OPEN UNIVERSITY OF TANZANIA

Ref. No OUT/PG2022000768   24th April, 2025

District Executive Director (DED),
Karagwe District Council,
P.O. Box 20,
KAGERA.

Dear Director,

RE: RESEARCH CLEARANCE FOR MR. SIMON IBRAHIM, REG NO: PG2022000768

2.   The Open University of Tanzania was established by an Act of Parliament No. 17 of 1992, which became operational on the 1st March 1993 by public notice No.55 in the official Gazette. The Act was however replaced by the Open University of Tanzania Charter of 2005, which became operational on 1st January 2007. In line with the Charter, the Open University of Tanzania mission is to generate and apply knowledge through research.

3.   To facilitate and to simplify research process therefore, the act empowers the Vice Chancellor of the Open University of Tanzania to issue research clearance, on behalf of the Government of Tanzania and Tanzania Commission for Science and Technology, to both its staff and students who are doing research in Tanzania. With this brief background, the purpose of this letter is to introduce to you **Mr. Simon Ibrahim, Reg.No: PG2022000768**, pursuing **Master of Education in Curriculum Design and Development (MEDCDD)**. We here by grant this clearance to conduct a research titled **"An Assessment of the Effectiveness of Audio-Visual Teaching and Learning Aids on Developing Student's Critical Thinking: A Case of Secondary Schools in Karagwe District"**. He will collect his data at your area from 25th April to 30th May 2025.

4. In case you need any further information, kindly do not hesitate to contact the Deputy Vice Chancellor (Academic) of the Open University of Tanzania, P.O.Box 23409, Dar es Salaam. Tel: 022-2-2668820.We lastly thank you in advance for your assumed cooperation and facilitation of this research academic activity.

Yours sincerely,

THE OPEN UNIVERSITY OF TANZANIA

Prof.Gwahula Raphael Kimamala

For: VICE CHANCELLOR

PART G: RESEARCH PERMIT LETTER

JAMHURI YA MUUNGANO WA TANZANIA
OFISI YA RAIS
TAWALA ZA MIKOA NA SERIKALI ZA MITAA

HALMASHAURI YA WILAYA KARAGWE

Unapojibu tafadhali taja:

Kumb. Na. KGR/HWK/T.4/48/138   28/04/2025

Simon I. Masamilo
Shule ya Msingi Bujuruga,
S.L.P 491,
KARAGWE.

Yah: **KIBALI CHA KUFANYA UTAFITI KATIKA SHULE ZA SEKONDARI**

Husika na mada tajwa hapo juu ukirejea barua yako ya tarehe 24/04/2025
isiyokuwa na Kumbukumbu namba.

2.0.   Kibali kimetolewa kufanya utafiti unaohusu "An assessiment of the
effectiveness of Audio-visual Teaching and Learning Aids on Developing
Stundent's Critical Thinking. A case of Secondary School in Karagwe District".
Katika Shule za Sekondari za Ndama, Kihanga, Igurwa, Kiruruma na Nyakataro. Aidha
nakutaka uzingatie Kanuni na taratibu za kufanya utafiti. Ikiwa ni pamoja na kutunza siri
za washirika

3.0.   Nakutakia kazi njema.

Wandere P. Lwakatare
Kny: **MKURUGENZI MTENDAJI**

DISTRICT EXECUTIVE DIRECTOR
KARAGWE DISTRICT COUNCIL
P.O. Box. 20
KARAGWE

Nakala: Mkurugenzi Mtendaji,
Halmashauri ya Wilaya,
KARAGWE   -   Aisome katika jalada

Mtaa wa Bomani, S.L.P 20,Karagwe, SIMU: +255 (028) 2227148, Nukushi: +255 (028) 2227140
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MANUSCRIPT

An Assessment of the Effectiveness of Audio-Visual Teaching and Learning Aids on Developing Students' Critical Thinking: A Case of Secondary Schools in Karagwe District, Tanzania

Simon Ibrahim[1], Edgar Fidel Nderego[2], Janet Kigobe[3]
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Abstract

This study evaluated the effectiveness of audio-visual (AV) teaching and learning aids in enhancing critical thinking skills among students in public secondary schools in Karagwe District, Tanzania. Using a quantitative survey design, data were collected from 346 students across five schools. Grounded in constructivist learning theory, which emphasizes active learner engagement in knowledge construction, the study investigated how AV tools support cognitive skill development. Findings showed that approximately seventy percent of students rated AV aids as effective or very effective in improving comprehension, while over sixty percent reported significant gains in critical thinking abilities, such as analysis, evaluation, and problem-solving. The use of AV materials also correlated with increased classroom participation, particularly in science, geography, and civics lessons. Despite these benefits, challenges including limited availability of AV equipment, inadequate teacher training, and poor integration into lesson plans constrained their impact. The study recommends targeted investment in AV infrastructure, incorporation of AV pedagogy into teacher professional development, and systematic monitoring of AV use at the school level to maximize learning outcomes.

Keywords: Audio-visual aids, critical thinking, secondary education, constructivist pedagogy, Tanzania

Introduction

Critical thinking is widely recognized as an essential competency for the 21st century, transcending traditional academic knowledge to support personal growth, economic participation, and social inclusion. In today's increasingly information-driven and technology-rich world, the ability to think critically enables learners to analyze information effectively, solve complex problems, and adapt to ever-changing environments. The World Economic Forum (2020) identifies critical thinking as a foundational skill underpinning creativity, communication, collaboration, and digital literacy, all vital for students' lifelong learning and active societal engagement. Consequently, fostering critical thinking within education systems is crucial to prepare students to meet the demands of the modern world.

Globally, developing critical thinking skills among secondary school students remains a major challenge. For example, the National Center for Education Statistics (NCES, 2023) reported that only about a third of high school students in the United States demonstrate proficiency in critical thinking. Similarly, data from India's Annual Status of Education Report (ASER, 2022) reveals that fewer than half of secondary school learners possess the critical thinking abilities necessary for higher-order academic tasks. Research conducted in rural China by Li et al. (2021) also highlights significant deficits in critical thinking, often attributed to traditional, teacher-centered instructional approaches. These international findings underscore the widespread and persistent nature of critical thinking challenges across diverse educational systems.

Within sub-Saharan Africa, the situation is even more pronounced. The Southern and Eastern Africa Consortium for Monitoring Educational Quality (SACMEQ, 2020)

reports that many Grade 8 learners in countries such as Kenya and Uganda face difficulties with analytical and reasoning tasks. In Tanzania, data from the National Examinations Council of Tanzania (NECTA, 2023) indicates that less than one-third of secondary school students meet the expected critical thinking proficiency levels in national examinations. These trends reflect broader systemic issues, including limited implementation of learner-centered pedagogies, inadequate teaching resources, and insufficient teacher training focused on developing cognitive and interactive skills.

At the local level in Karagwe District, Tanzania, educational challenges are compounded by resource shortages and infrastructural inadequacies. According to recent reports from the Karagwe District Education Office (2024), fewer than 30% of secondary school students demonstrate satisfactory critical thinking abilities in classroom assessments. Many schools lack essential audio-visual teaching and learning aids, and the integration of technology into instructional practices remains minimal. This context highlights an urgent need to explore and implement pedagogical innovations that can effectively nurture critical thinking skills in Karagwe's secondary schools.

Several Tanzanian studies have addressed related themes but have left critical gaps that this study aims to fill. Mtebe and Raisamo (2014) examined the adoption of mobile learning but did not assess its impact on students' cognitive skills such as critical thinking. Ngonyani (2017) investigated teachers' use of multimedia aids, focusing primarily on student engagement rather than cognitive development. Mwangi (2019) identified infrastructural challenges limiting technology use but did not explore pedagogical outcomes related to critical thinking. Mutalemwa (2020) studied teacher professional development without explicit links to improvements in

students' critical thinking. More recently, Komba and Kira (2022) explored ICT usage in Tanzanian secondary schools but did not concentrate on the specific role of audio-visual aids in fostering analytical and reasoning skills. Collectively, these studies point to a lack of focused empirical research on how audio-visual teaching and learning aids influence critical thinking development among secondary school students, particularly in rural Tanzanian settings.

This study is grounded in the Vygotsky's Constructivist Learning Theory, which conceptualizes learning as a socially mediated process whereby interaction with teachers, peers, and instructional tools is fundamental to cognitive development (Vygotsky, 1978). Audio-visual aids, as interactive and multimodal resources, provide learners with opportunities to engage more deeply with content, facilitating scaffolding and collaborative learning that are essential for nurturing critical thinking.

Building on this theoretical framework, the study investigates how audio-visual teaching and learning aids are utilized in secondary schools within Karagwe District. It examines the extent and methods of their integration into classroom instruction, explores both student and teacher perceptions of their impact on developing critical thinking skills, and identifies challenges hindering effective implementation. Through these objectives, the research aims to generate evidence-based recommendations to improve teaching practices and learning outcomes, ultimately enhancing critical thinking among secondary school students in rural Tanzania.

Theoretical Framework

This study is anchored in the constructivist learning theory, which emphasizes that learners actively construct their own knowledge and understanding through

experiences, reflection, and interaction with their environment (Piaget, 1954; Vygotsky, 1978). Constructivism regards learning as a dynamic, participatory process rather than a passive absorption of facts, highlighting the critical role of meaningful engagement with content, peers, and instructors in shaping cognitive development.

Within this theoretical lens, audio-visual (AV) teaching and learning aids are viewed as essential tools that promote interactive and immersive learning environments. By delivering content through multiple sensory channels visual, auditory, and sometimes kinesthetic AV aids encourage students to actively participate, explore ideas, pose questions, and critically reflect on the material presented. This multimodal engagement fosters deeper understanding and supports the cultivation of higher-order cognitive skills, such as analysis, evaluation, and synthesis, which are fundamental components of critical thinking.

The constructivist perspective thus provides a robust framework for this study, as it aligns closely with the research objective of assessing how the use of AV aids can enhance students' critical thinking abilities. These tools facilitate learner-centered and experiential learning processes that enable students to construct, test, and refine their knowledge actively, moving beyond rote memorization towards meaningful comprehension and application. Consequently, constructivism offers an appropriate and comprehensive theoretical foundation to examine the pedagogical impact of AV teaching aids in secondary schools within Karagwe District.

Methodology

This study adopted a quantitative research approach using a survey design to assess the effectiveness of audio-visual teaching and learning aids in developing critical

thinking skills among secondary school students in Karagwe District. The survey design was chosen because it allows data collection from a large and diverse group of participants, enabling generalization of findings about students' perceptions and experiences (Creswell, 2014).

The research was guided by the positivist paradigm, which emphasizes gathering observable and measurable data to produce objective knowledge (Saunders, Lewis, & Thornhill, 2019). This philosophical foundation supported the use of structured questionnaires and statistical analysis to evaluate the impact of audio-visual aids on critical thinking development.

Karagwe District was selected as the study site due to its historically low secondary school performance, particularly in areas requiring critical thinking skills (NECTA, 2023). The district faces challenges such as limited teaching resources and inadequate teacher training, making it a suitable context for examining the role of audio-visual aids in enhancing learning outcomes.

The target population consisted of students from five public secondary schools Kihanga, Kiruruma, Nyakatoro, Igurwa, and Ndama with a combined enrollment of approximately 2,517 students (Karagwe District Council, 2024). Including multiple schools ensured a representative sample capturing diverse student experiences across the district.

A combination of convenience sampling and stratified random sampling was employed. Convenience sampling allowed for the selection of participants who were readily accessible and willing to participate (Etikan, Musa, & Alkassim, 2016), while stratified random sampling ensured proportional representation of students from each school to improve the sample's representativeness.

The sample size was calculated to be 346 respondents using Israel's (2009) formula for finite populations, considering the total population of 2,517 students and a margin of error of 5%. Data were collected using a structured questionnaire composed of closed-ended questions designed to capture demographic information and students' perceptions regarding the effectiveness of audio-visual aids in promoting critical thinking.

To enhance validity, a pilot study was conducted with 10 students from a similar population. The pilot helped assess the questionnaire's clarity, relevance, and comprehensiveness, and the feedback informed necessary refinements (Cohen, Manion, & Morrison, 2018). The reliability of the instrument was confirmed through the test-retest method, where participants completed the questionnaire twice within a one-week interval to verify consistency of responses (Bryman, 2016).

Data analysis was conducted using SPSS version 20. Descriptive statistics such as means, frequencies, and standard deviations summarized student responses. Inferential statistics were also employed: paired-sample t-tests evaluated differences before and after the intervention; ANOVA tested differences among groups; Pearson's correlation assessed relationships between variables; and multiple regression analysis identified predictors influencing the development of critical thinking. Results were presented using tables and graphs to facilitate clear interpretation.

Ethical clearance was obtained from the Open University of Tanzania (OUT) and the Karagwe District Council (KDC). Participants gave informed consent after being fully briefed on the study's purpose and their rights, including voluntary participation

and confidentiality. Throughout the research process, data anonymity and privacy were strictly maintained to uphold ethical standards.

Findings and Discussion

This chapter presents and discusses the findings of the study based on the research objectives. Data were collected through a structured questionnaire administered to students from five public secondary schools in Karagwe District. The analysis was guided by descriptive statistics and interpreted in light of the constructivist learning theory, supported by empirical literature.

Effectiveness of Audio-Visual Aids in Enhancing Students' Critical Thinking Skills

The first objective of this study was to assess the extent to which audio-visual (AV) teaching and learning aids contribute to the development of students' critical thinking skills. Table 4.1 presents the students' responses on this aspect.

Table 4.1: Effectiveness of AV Aids in Enhancing Critical Thinking Skills

Response Type	Frequency	Percentage (%)
Very Effective	128	37.0
Effective	114	32.9
Neutral	58	16.8
Ineffective	26	7.5
Very Ineffective	20	5.8
Total	**346**	**100**

The results indicate that a significant majority of students (69.9%) perceived AV aids as either effective or very effective in developing critical thinking. This suggests that AV materials provide students with engaging and cognitively stimulating content, promoting active analysis and evaluation. The findings align with constructivist

principles, which emphasize the importance of learner engagement and exploration in cognitive development.

This finding is supported by Vygotsky's (1978) social constructivist theory, which holds that interaction with tools and media within a learning context fosters the development of higher-order thinking. It also resonates with the findings of Mugisha et al. (2020), who reported that the integration of video and image-based resources in Rwandan classrooms improved learners' problem-solving and interpretation skills.

However, a notable proportion of students (16.8%) remained neutral, and 13.3% considered AV aids ineffective. This points to contextual factors such as the frequency of AV use, the relevance of the content, and the quality of facilitation by teachers, which may influence perceptions.

Students' Perceived Benefits of AV Aids in Classroom Engagement

The second objective was to explore students' views regarding how AV aids enhance classroom participation and engagement. Table 4.2 summarizes the students' responses.

Table 4.2: Perceived Benefits of AV Aids on Classroom Engagement

Response Type	Frequency	Percentage (%)
Strongly Agree	142	41.0
Agree	117	33.8
Neutral	53	15.3
Disagree	20	5.8
Strongly Disagree	14	4.1
Total	346	100

Approximately 74.8% of respondents either strongly agreed or agreed that AV aids promote active classroom participation. Students reported increased attention,

motivation, and interaction during lessons that employed AV tools. Subjects such as science, geography, and civics were highlighted as benefiting significantly due to the visual and practical nature of AV content.

This finding is supported by Dual Coding Theory (Paivio, 1986), which argues that combining visual and verbal information improves comprehension and memory. The results are also consistent with Lapuz and Fulgencio (2020), who found that multimedia-enhanced instruction increased student engagement and participation in Philippine secondary schools.

Nevertheless, 15.3% of students remained neutral and 9.9% disagreed or strongly disagreed, suggesting that the effectiveness of AV aids in engagement depends on how well they are integrated into teaching strategies. If the aids are used without clear pedagogical intent or technical competence, they may fail to stimulate participation.

Challenges Facing the Use of AV Aids in Teaching and Learning

The third objective was to identify challenges that hinder the effective use of AV aids in secondary school classrooms. Table 4.3 outlines the major challenges reported by students.

Table 4.3: Reported Challenges in the Use of AV Aids

Challenge	Frequency	Percentage (%)
Inadequate AV equipment	136	39.3
Poor integration in lesson plans	102	29.5
Lack of teacher training	78	22.5
Power/equipment failures	30	8.7
Total	**346**	**100**

The most common challenge identified was the limited availability of AV equipment (39.3%), followed by poor integration in lesson planning (29.5%). Many students indicated that AV tools were not used consistently across subjects or lessons, and some teachers lacked the training to operate or incorporate them effectively. Technical issues such as power outages and broken equipment were also noted.

These findings highlight systemic issues that limit the educational impact of AV aids, despite their pedagogical value. This aligns with the findings of Mtebe and Raphael (2018), who observed that Tanzanian schools face persistent infrastructure and capacity gaps that undermine the effective use of educational technology. From a theoretical perspective, these barriers hinder the conditions necessary for constructivist, experiential learning to thrive.

Summary of Findings

The findings reveal that AV aids are perceived positively by students in terms of fostering critical thinking and increasing engagement. However, the realization of these benefits is often constrained by logistical and pedagogical challenges. The results affirm the relevance of constructivist learning theory in guiding AV tool usage and point to the need for capacity building, infrastructure development, and curriculum alignment to ensure effective implementation.

In the next chapter, these findings will be further interpreted in the context of broader educational policies and implications for future practice.

Conclusion

This study assessed the effectiveness of audio-visual teaching and learning aids in developing students' critical thinking in selected secondary schools within Karagwe

District. The investigation was guided by the aim of understanding how these technological tools influence students' ability to think critically and independently. Findings from the study revealed that both teachers and students generally held positive perceptions toward the use of audio-visual aids, acknowledging them as essential in enhancing engagement, understanding, and active participation during classroom sessions. These tools were found to stimulate learners' curiosity, improve concept retention, and promote classroom interaction, all of which are critical components in nurturing critical thinking.

Additionally, the study demonstrated that audio-visual aids such as educational videos, digital simulations, infographics, and multimedia presentations enabled students to observe real-life scenarios, analyze situations, and draw informed conclusions. Teachers who had access to such resources and had been trained on their proper application were more effective in cultivating analytical and evaluative skills among learners. However, despite the potential benefits, several challenges were noted. These included limited availability of equipment, unreliable electricity, and lack of appropriate digital content, insufficient training, and minimal institutional support for the integration of ICT in teaching.

In summary, while the use of audio-visual teaching and learning aids in Karagwe District secondary schools shows promise in developing students' critical thinking, the extent of their impact remains constrained by infrastructural, technical, and pedagogical limitations. Therefore, there is a need for coordinated efforts at both school and policy levels to ensure that these tools are accessible, effectively utilized, and aligned with teaching goals to maximize their contribution to learners' cognitive development.

Recommendations

Based on the findings of this study, several practical and policy-oriented recommendations are proposed to enhance the effectiveness of audio-visual aids in developing students' critical thinking. Firstly, the government, in collaboration with educational stakeholders, should invest significantly in ICT infrastructure and provide secondary schools with the necessary audio-visual tools, including projectors, computers, speakers, and reliable power supply. Such investment is crucial to ensuring that schools are adequately equipped to facilitate modern, learner-centered pedagogies that encourage critical inquiry.

Secondly, there is a pressing need for continuous professional development for teachers on the integration of audio-visual aids into instruction. Training should not only focus on technical skills but also on instructional strategies that link audio-visual content to critical thinking outcomes. Empowering teachers with such competencies will improve the quality and frequency of audio-visual use in classrooms.

Thirdly, the national curriculum should be reviewed to incorporate explicit guidance on the use of audio-visual materials in fostering analytical, evaluative, and problem-solving skills. Curriculum developers must ensure that time allocations and teaching schemes support the effective integration of digital content within subject instruction. Moreover, school leadership must play a proactive role in cultivating a culture that supports ICT-based teaching and learning. Heads of schools should encourage teachers to explore innovative methods, provide incentives for exemplary practice, and establish internal policies that promote the consistent use of audio-visual resources.

In addition, relevant education authorities should collaborate with local content developers to produce contextually appropriate audio-visual learning materials that resonate with students' linguistic, cultural, and academic environments. Such materials would enhance the relevance and relatability of classroom instruction.

Lastly, monitoring and evaluation mechanisms should be established to assess the use and effectiveness of audio-visual tools in schools. Regular supervision, feedback collection, and impact assessment will help identify areas for improvement, inform policy decisions, and ensure accountability in resource utilization.

Implementing these recommendations will strengthen the role of audio-visual aids in shaping critical thinkers and active learners, thereby aligning secondary education with 21st-century learning demands and national education goals.

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